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DRAWINGS ATTACHED

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(54) DEVICES FOR USE WITH SAFETY DEVICES IN OIL WELLS

(71) We, ENTREPRISE DE RECHERCHES ET D'ACTIVITES PETROLIERES (ELF), a Public Industrial and Commercial Body organised under the laws of France, of 7 Rue Nelaton, 75 - Paris (15), France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which is to be performed to be particularly described in and by the following statement:—

This invention relates to propelling devices for tools to lower or raise safty devices in oil wells.

Safety devices can be installed in underwater oil or gas wells by means of tools, pushed along a pipe by hydraulic pressure. These tools are pushed by propelling devices, which are units with a flexible sealing gasket, this gasket pressing against the wall of the pipe inside which the propelling device moves, as the result of the hydraulic pressure exerted on the gasket. Unfortunately, the gasket tends to wear out through rubbing.

According to the present invention a propelling device consists of a generally cylindrical hollow body open at both ends and having apertures in its walls, tubing of an elastomeric material surrounding the body, both ends of the tubing being fixed hermetrically to the body, and rigid fittings attached to the outer surface of the tubing, the fittings comprising a first series of segmental fittings spaced around the centre of the body at right angles to its longitudinal axis, and another series of fittings on each side of the first series, the fittings of the other series being elongate and each having one end in contact with a fitting of the first series, the arrangement being such that the pressure fluid entering the hollow part of the body and passing through the apertures urges the fittings radially outwards.

Such a device may ensure more or less permanent contact between at least a part of the outer wall of the propelling device and the inner wall of the pipe along which the device is moving.

The invention may be carried into practice in various ways, but one embodiment will now be described by way of example with reference to the accompanying drawings of which:

Figure 1 is a cross-section of a propelling device;

Figure 2 is a view from the outside of the membrane carrying the metal fittings, on the propelling device shown in Figure 1; and

Figure 3 shows how the fittings fit together.

Figure 1 shown a propelling device having a body 1 which is generally hollow and cylindrical in shape. The body 1 carries a membrane for example of neoprene which forms a flexible outer tubing 2. Metal fittings 3 are welded or glued to this tubing 2. These fittings, of which there are eight in the embodiment of the invention shown here, are segmental in shape and when the device is at rest, the segments are not in contact, but leave spaces 7 between them, about a millimetre wide. Tools normally used measure 60 to 100 mm in diameter.

Two series of elongated fittings 4 and 5 are fixed on each side of the fittings 3 with their edges abutting the fittings 3. There are sixteen fittings in each of these series 4 and 5 Every second fitting in each series is placed opposite the spaces 7 left between the ring segments. Openings 6 provide communicating passages between a central cavity 8 of the propelling device 1 and a annular chamber 9, provided between the main body and the tubing 2.

Figure 2 shows how the metal fittings are assembled.

The fittings 3 and elongate fittings 4 and 5 can be seen clearly, as well as rims 11 which anchor the deformable tubing 2 to the body of the device.

Figure 3 shows how the fittings fit together In particular, one can see the shape of the fittings 3, with, on each side of a central reinforcing section, two rims 3a and 3b, the ends of which, next to the spaces 7, fit loosely into slots 4a and 5a, in alternate elongate fittings 4 and 5. This slot may be seen in the upper

part of Figure 3. The remaining elongate fittings 4 and 5 press against the rims of the fittings 3 as shown in the lower part of Figure 3.

The end of each fitting 4 and 5 remote from the fittings 3 fit with the corresponding end of the tubing 2 into a ring-shaped groove 12, which forms part of a wider section 13 at the corresponding end of the body 1.

This propelling device operates as follows. The device is first attached to a raising or lowering tool which is to install or remove a saftey appliance in an oil well.

The tool assembly is inserted into a continous pipe running to the bottom of the well, and fluid under pressure is injected into the pipe behind the propelling device, pushing it along. This fluid passes through the openings 6 into the annular chamber 9, where it dilates the deformable tubing 2, pressing the fittings attached to this tubing against the inner wall of the pipe.

If there are variations in the inside diameter of the pipe, the metal fittings 3, 4 and 5 shift slightly in relation to one another, to match such variations, and continue to press against the pipe wall. In particular, it may be seen that they are articulated, and that at least one of the series of fittings constantly presses against the inner wall of the pipe. This means that there is a more or less uniform holding force, whatever the inside diameter of the pipe. The flexibility of the tubing means that the fittings 3 can move apart or together, thus increasing or reducing the nominal diameter of the gasket.

This propelling device can also be connected to maintenance tools, such as paraffin-removing blades or scrapers.

WHAT WE CLAIM IS:—

1. A propelling device for tools to lower or raise saftey apparatus in oil wells, the device consisting of a generally cylindrical hollow body open at both ends and apertures in its walls, tubing of a elastomeric material surrounding the body, both ends of the tubing being fixed hermetically to the body, and rigid fittings attached to the outer surface of the tubing, the fittings comprising a first series of segmental fittings spaced around the centre of the body at right angles to its longitudinal axis, and another series of fittings on each side of the first series, the fittings of the other series being elongate and each having one end in contact with a fitting of the first series, the arrangement being such that the pressure fluid entering the hollow part of the body and passing through the apertures urges the fittings radially outwards.

2. A propelling device as claimed in claim 1 in which an elongate fitting is situated adjacent each space between two fittings of the first series, the width of the elongate fitting being wider than the space.

3. A propelling device as claimed in claim 2 in which between every two elongate fittings adjacent a space between two fittings of the first series there is at least one other elongate fitting.

4. A propelling device as claimed in claim 2 or claim 3 in which the end of each elongate fitting adjacent a space between two fittings of the first series is bifurcated and fits loosely to part of the ends of the two fittings of the first series.

5. A propelling device as claimed in claim 4 in which the fittings of the first series are T—shaped in cross-section the central section extending outwards from the tubing and the two arms of the T fitting inside the bifurcated ends of the elongate fittings.

6. A propelling device as claimed in any of the preceding claims in which the other end of each elongate fitting is embedded with the corresponding end of the tubing in an annular groove which forms part of a wider section at the corresponding end of the hollow body.

7. A propelling device substantially as herein described with reference to the accompanying drawings.

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1321152 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

Fig: 1.

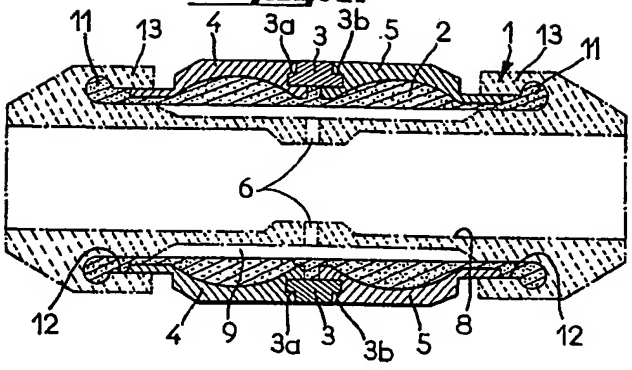

Fig: 2.

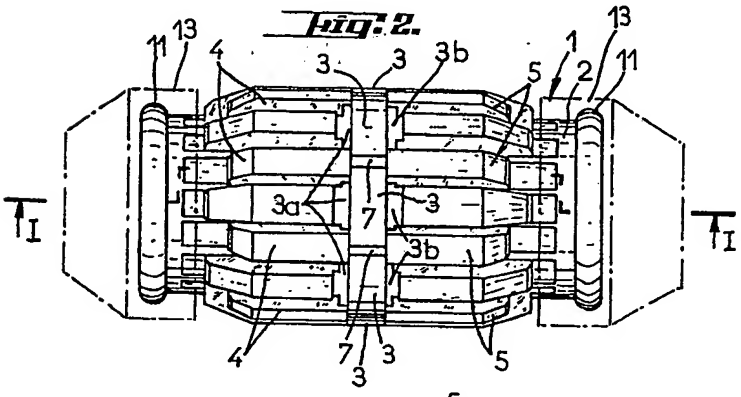

Fig: 3.